COURSE: Prescribed Fire Planning and Implementation

TOPIC: Monitoring (Unit 9)

I. Objectives:

A. Understand what MONITORING is and why it's important in prescribed fire applications.

B. Understand the importance of a MONITORING PLAN and what are the components.

II. What is monitoring?

AThe collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective.@

Monitoring is inherent in the adaptive management cycle and has two key components:

1. Monitoring is driven by objectives.

2. Monitoring is only initiated if opportunities for management change exist.

Monitoring occurs at all objective levels of management from broad land management objectives to specific prescribed fire treatment objectives. For example:

Planning Level	Management Objective	Monitoring Attribute
Comprehensive Conservation Plan	Restore and sustain an ecological functional mixed grass prairie	ecological function
Habitat Management Plan	Restore vegetation species diversity to 1870 conditions as reported in Smith (1870).	species composition
Fire Management Plan	Restore a historic wildland fire regime (low to moderate intensity late spring to early fall fires at 3 to 8 year intervals) to all mixed grass prairie communities by 2003 in order	spatial fire frequency

	to sustain community stability.	
Prescribed Fire Plan	Reduce post fire (~ 1 month post fire) litter to_ ~ 100 (50 - 500) lbs./acre (dry weight) in all mixed grass prairie communities to restore historic soil moisture conditions.	post fire litter loading

III. What is prescribed fire monitoring?

AThe collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a prescribed fire management objective.@

A. What is the importance of monitoring?

1. It helps us to measure how well your treatment objectives have been met.

2. It provides a basis for improving economic efficiency. Each burning effort involves time and money. Monitoring and evaluation have a primary function in minimizing burn expenditures and maximizing accomplishment of objectives.

   An example: One of your objectives is to burn a unit for site prep, reducing fuel loading to a specified percentage. After the burn, it was noted that site prep specs had not been met. If fuel moistures and pre-burn fuel loadings had not been adequately documented, and adjustments are not made for future burns, then this "failure" might be repeated. There will be an increase in costs for reburning the unit, in seeking other methods of site prep, or in planting costs.

3. It provides a validation of fire behavior outputs. Fire behavior predictions are typically used for prescription development. Monitoring of fire behavior allows us to compare predicted fire behavior to actual fire behavior. This in turn allows us to determine whether we were using the appropriate fuel model, or adjust our prescriptions for future use.

4. It gives you opportunities to refine prescriptions based on actual experience. Were the weather parameters adequate? Were you able to protect certain species of wildlife trees from fire? How well did you save the wildlife clumps?

5. It allows you to improve our information sharing. How can you objectively tell others what worked and what didn't, if you don't

monitor your activities? Document, document, document! Don't rely on your memory to recall events from last year.

B. What should be monitored?

1. Prescription elements

2. Attributes related to the burn (treatment) objectives

C. Prescribed fire (treatment) attributes that can be observed and measured (but certainly is not limited to):

1. Fire Behavior

2. Weather

3. AFirst Order@ or Immediate Fire Effects

Observations and measurements collected and recorded is the basis for evaluating a project, and managerial adjusting of the overall prescribed fire program.

Exercise:

What are some attributes at your home unit that are monitored by:

A. BURN BOSS

B. PRESCRIBED FIRE MANAGER

C. REFUGE BIOLOGIST

VI. Components of a prescribed fire monitoring plan.

With so many things to monitor, and too little time or personnel, what is the best way to approach monitoring? All too often we concentrate on only an issue here, a result over there, but it is hit and miss. To be cost effective and efficient, it's worth the extra time to plan your monitoring efforts. It can be in the form of a lengthy, detailed document, or can be a one-pager outlining your monitoring efforts. Some managers may keep the plan in their head, which is a pain for

everyone else, and it's possible that some places don't have a plan at all! Don=t let this be you.

A. Identify the scope of the activity.

- Decide how extensive/intensive you want to get.
- Which fires will you monitor - all, some, or a sampling?
- Will you collect the same info on all units, or just monitor for the controversial issues?
- What constraints do you have? Personal/financial/time?
- And finally, what do you want as an end result?

WHAT will be monitored?
WHO will do the monitoring?
WHEN will it take place?
WHERE will it take place?
HOW will the activity be monitored?

B. What will be the level of monitoring?

1. GENERAL LEVEL: Info available at little cost

- Info from maps, management plans, other documents
- Vegetative type, fuel type, soil type, topography
- Expert judgment
- Info from off-site sources: Wx, fuel moistures from WIMS/RAWS weather stations

2. QUALITATIVE LEVEL: Reconnaissance-type info collected on-site with a particular management objective in mind

- Survey major components of vegetation: species, size, age, vigor
- Evaluate fuel loadings (photo series or debris prediction)
- Periodic on-site weather measurements
- Fuel moisture sticks
- Narrative of fire behavior and effects

3. QUANTITATIVE LEVEL: Adequate sampling

- Line intercept sampling of fuels
- Continuous on-site monitoring of weather
- Sampling actual fuel moistures
- Systematic sampling of fire behavior (ROS, flame length)
- Systematic sampling of fire effects (duff reduction, crown scorch, tree mortality). This allows for statistical analysis of facts, but also costs the most.

The level of monitoring should be considered before starting. Low likelihood of changing future actions (due to politics, non-ecological constraints, etc.) should be carefully considered before starting.

C. When does monitoring take place?

DON'T DECIDE TO MONITOR THE BURN AFTER THE FIRE IS OVER!!!

1. PRE-BURN:

Determine the conditions prior to burning. This period can extend from before the prescribed fire is approved until ignition. What are some things you monitor in the pre-burn stage?

2. DURING THE BURN:

Monitoring during this period provides necessary information to determine whether or not the fire remains in prescription and provides data on variation in fire intensity needed to evaluate post-fire effects. What do you monitor in this stage?

3. POST-BURN:

The final monitoring period extends from the time the fire is out until all required measurements are taken. Often they are made immediately after the fire is out, but can extend for several months or years afterward. What things can you monitor during this phase?

D. Who will do the monitoring/evaluation?

It depends on the interdisciplinary participation. Involvement from the resource specialists is as important for monitoring as it was for project planning. The complexity of the information needed will also determine who participates. This isn't a cut-and-dried answer, and will often be negotiated by the program managers.

E. How will the activity be monitored?

Methods, techniques, and devices utilized in the monitoring process are dependent on the level of information desired and the particulars of the variable being measured and recorded.

Some easy monitoring methods include:

- OBSERVATIONS: A trained fire behavior observer can estimate flame length and rate of spread during the prescribed fire. In addition, this person can be responsible to take and record weather data, scorch height, etc.

- PHOTO POINTS: Establishment of photo points to record pre- and post- burn vegetation is an easy, but not statistically sound method of record changes in vegetation. Some of the finer changes in vegetation may not be captured with photography, unless specific small areas are captured on film.

- TRANSECTS: Simple 50' transects can be used to record burn severity, and in some cases, changes in species composition, if the monitor/observer has the necessary botanical skills.

F. How will the information be used to affect a management change?

Identify what changes in the prescription or plan implementation will occur when a monitored attribute reaches a pre-established level.